REMARKS

By this amendment, claims 1-18 are pending, in which claims 13-18 are newly presented, and claims 1, 7, and 10-12 are amended. No new matter is introduced since adequate descriptive support for new FIG. 5 may be found throughout the specification, for example, in ¶ 19 as originally submitted.

The Office Action mailed September 25, 2002 objected to the drawings under 37 CFR § 1.83(a), the specification, and claims 7 and 12 as allowable but dependent on a rejected base claim. Claims 1-2 and 11 stand rejected under 35 U.S.C. § 102 as anticipated by *Hase* (JP 62-59822 A), claims 1, 8, and 11 as anticipated by *Sharp* (JP 2001-126293 A), claim 3 as obvious under 35 U.S.C. § 103 based on *Hase*, claim 9 as obvious over *Hase* in view of *Inami et al.* (US 5,612,810), and claims 4-6 and 10 as obvious over *Sharp*.

In response to the objections, a new FIG. 5 is submitted, which has adequate descriptive support at least in ¶ 21 as originally filed. Moreover, ¶ 19 is amended as helpfully suggested in the Office Action, claim 7 is rewritten into independent form, and allowable subject matter from claim 12 is incorporated into independent claim 11.

The rejection of claim 10, as amended, is respectfully traversed because *Sharp* does not teach or suggest the limitations of the claim. For example, claim 10 recites: "sinking, <u>from</u> a second node <u>to ground</u>, a current greater than the current generated by the sensor," but no such recited sinking of current is shown from node Vref of FIG. 2 of *Sharp*. However, current source 14 is configured to source, not sink, current from Vcc to Vref, and current source 13, cited in the Office Action, is not even coupled to node Vref, but to the base of transistor Tr4 instead.

For similar reasons, *Sharp* also fails to teach or suggest "wherein the current source is configured to sink a current from the second input to ground" recited in amended, independent

claim 1. *Hase* too does not suggest this feature, because current source 12 of FIG. 2 of *Hase* merely sources current from voltage source V_B or V_S.

Therefore, the present application, as amended, overcomes the objections and rejections of record and is in condition for allowance. Favorable consideration is respectfully requested. If any unresolved issues remain, it is respectfully requested that the Examiner telephone the undersigned attorney at (703) 425-8508 so that such issues may be resolved as expeditiously as possible.

Respectfully Submitted,

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APPENDIX

IN THE SPECIFICATION:

[16.5] FIG. 5 depicts one implementation of a constant current source.

[19] A constant current source 117, moreover, is coupled between the input node 103 and ground. The constant current source 117 is configured to sink to ground at least as much current from the input node 103 as the maximum signal current IS produced by the photodiode 115 in response to light and returned through the feedback resistor [411] 111.

[21] In one implementation illustrated in FIG. 5, the constant current source 117 comprises a field effect transistor (FET) 501 having a drain coupled to the input node 103 and a source coupled to ground. The gate of the field effect transistor is biased by a band gap circuit. The band gap circuit is configured to provides a suitable gate voltage (VGS) so that a constant current flows through the channel of the field effect transistor. In one arrangement, the field effect transistor operates in saturation mode and causes a saturation current IDSAT to pass through the channel of the field effect transistor from the input node 103 to ground. The saturation current IDSAT of a field effect transistor is proportional to the square of the potential difference between the gate and source. The bipolar junction transistor 119 also serves to fix voltage across the drain and source (VDS) to a constant value because the voltage at the emitter is VREF – VBE, where VREF is the reference voltage applied to the base of the bipolar junction transistor 119, and VBE is the threshold voltage across the base and the emitter of the bipolar junction transistor 119.

IN THE CLAIMS:

1. (Once Amended) A circuit for amplifying a signal from a sensor, comprising:

a current source; and

a differential amplifier having a first input coupled to the sensor and a second input coupled to the current source;

wherein the current source is configured to sink a current from the second input to ground.

2. (Not Amended) A circuit according to claim 1, further comprising:

a first feedback resistor coupled to the sensor and to a first output of the differential amplifier; and

a second feedback resistor coupled to the current source and to a second output of the differential amplifier.

3. (Not Amended) A circuit according to claim 2, wherein a gain of the circuit is approximately twice a sum of resistances of the first feedback resistor and the second feedback resistor.

4. (Once Amended) A circuit according to claim 1, wherein [the current source is configured to produce a] the current sunk by the current source is greater than a current produced by the sensor.

5. (Not Amended) A circuit according to claim 1, wherein the current source includes a field effect transistor coupled between the second input and ground and configured to operate in saturation mode.

6. (Not Amended) A circuit according to claim 5, further comprising a bipolar junction transistor having an emitter coupled to the second input and the current source.

7. (Once Amended) A circuit [according to claim 6] <u>for amplifying a signal from a sensor, comprising:</u>

<u>a current source;</u>

<u>a differential amplifier having a first input coupled to the sensor and a second input coupled to the current source; and</u>

<u>a</u> [wherein the] bipolar junction transistor [has] <u>having an emitter coupled to the second input and</u> a base coupled to a reference voltage, whereby a voltage at the second input is fixed.

8. (Not Amended) A circuit according to claim 1, wherein the sensor comprises a photodiode.

9. (Not Amended) A circuit according to claim 1, further comprising a post-amplifier having inputs coupled to outputs of the differential amplifier.

10. (Once Amended) A method of amplifying a signal from a sensor, comprising:

receiving, at a first node, a current generated by the sensor;

sinking, [at] <u>from</u> a second node <u>to ground</u>, a current greater than the current generated by the sensor; and

differentially amplifying the signal based on signals at the first node and the second node.

11. (Once Amended) An optical front-end, comprising:

a photodiode, responsive to light borne by an optical link; [and]

a differential amplifier having a first input coupled to the photodiode and a second input coupled to a constant current source; and

a bipolar junction transistor having a collector coupled to a supply voltage and an emitter coupled to the second input.

12. (Once Amended) An optical front-end according to claim 11, wherein the constant current source includes[:] a field effect transistor coupled between the second input and ground and configured to operate in saturation mode[; and a bipolar junction transistor having a collector coupled to a supply voltage and an emitter coupled to the second input].

13. (New) An optical front-end according to claim 11, wherein the bipolar junction transistor is configured to fix a potential to the second input at a constant value.

14. (New) An optical front-end according to claim 11, further comprising:

a first feedback resistor coupled to the photodiode and to a first output of the differential amplifier; and

a second feedback resistor coupled to the constant current source and to a second output of the differential amplifier.

15. (New) An optical front-end according to claim 14, wherein a gain of the differential amplifier is approximately twice a sum of resistances of the first feedback resistor and the second feedback resistor.

16. (New) An optical front-end according to claim 11, wherein the current sunk by the constant current source is greater than a current produced by the sensor.

17. (New) A method according to claim 10, further comprising:

providing a first feedback resistance between the first node and a first output of said differential amplifying; and

providing a second feedback resistance between the second node and a second output of the differential amplifying.

18. (New) A method according to claim 17, wherein a gain of said differential amplifying is approximately twice a sum of the first feedback resistance and the second feedback resistance.